State of California
AIR RESOURCES BOARD

Executive Order G-70-118-AA

Modification to the Certification of the
Amoco Oil Company V-1 Bootless Nozzle Vapor Recovery System
for Gasoline Dispensing Facilities

WHEREAS, the Air Resources Board (the "Board") has established, pursuant to Sections 39600, 39601 and 41954 of the Health and Safety Code, certification procedures for systems designed for the control of gasoline vapor emissions during motor vehicle fueling operations ("Phase II vapor recovery systems") in its "Certification Procedures for Gasoline Vapor Recovery Systems at Service Stations" as last amended December 4, 1981 (the "Certification Procedures"), incorporated by reference in Section 94001 of Title 17, California Code of Regulations;

WHEREAS, the Board has established, pursuant to Sections 39600, 39601 and 41954 of the Health and Safety Code, test procedures for determining the compliance of Phase II vapor recovery systems with emission standards in its "Test Procedures for Determining the Efficiency of Gasoline Vapor Recovery Systems at Service Stations" as last amended September 1, 1982 (the "Test Procedures"), incorporated by reference in Section 94000 of Title 17, California Code of Regulations;

WHEREAS, Amoco Oil Company ("Amoco") requested and was granted certification of the Amoco V-1 bootless nozzle vapor recovery system pursuant to the Certification Procedures and Test Procedures by Executive Order G-70-118, issued June 24, 1988, application limited to one specific dispenser;

WHEREAS, Amoco has in good faith requested modifications to the certification of the Amoco V-1 bootless Phase II vapor recovery system, including the following:

- certification of the V-1 system for use with all types of dispensers without reference to specific models, and the
- addition of the Husky Model V-1 nozzle and the OPW Model 11-VAA nozzle to the list of equipment certified for use with the V-1 system;

WHEREAS, subsequent to Amoco's request for modification of the certification, the Test Procedure (Method 2-1) was found to overestimate the effectiveness of some Phase II systems;

WHEREAS, a new test procedure ("Draft Test Procedure TP-201.1") has been developed which more accurately measures the effectiveness of some Phase II vapor recovery systems;

WHEREAS, the Amoco V-1 system was subjected to efficiency tests on March 23 through 26, 1992, and on June 2 through 4, 1992, and the test results were

calculated using both the original Method 2-1 test procedure and the Draft Test Procedure TP-201.1;

WHEREAS, Draft Test Procedure TP-201.1 was adopted as an alternative test procedure pursuant to Section 3.7 of Method 2-1 on July 13, 1992, by Executive Order G-70-141;

WHEREAS, the Amoco V-1 Phase II vapor recovery system has been evaluated pursuant to the Board's Certification Procedures;

WHEREAS, I find that the Amoco V-1 Phase II vapor recovery system conforms with all the requirements set forth in Sections I through VII of the Certification Procedures, and results in a vapor recovery system which, when tested in accordance with Method 2-1 of the Test Procedures, is at least 95 percent effective for attendant and/or self-serve use at gasoline service stations when used in conjuction with a Phase I vapor recovery system which has been certified by the Board;

WHEREAS, I find that the Amoco V-1 Phase II vapor recovery system conforms with all the requirements set forth in Sections I through VII of the Certification Procedures, and results in a vapor recovery system which, when tested in accordance with Draft Test Pocedure TP-201.1, is at least 90 percent effective for attendant and/or self-serve use at gasoline service stations when used in conjuction with a Phase I vapor recovery system which has been certified by the Board; and

WHEREAS, local air pollution control districts and other regulatory agencies having regulations requiring Phase II vapor recovery systems which are at least 95 percent effective, are advised that Draft Test Procedure TP-201.1 is the preferred test procedure and gives the most accurate measure of the effectiveness of some Phase II vapor recovery systems;

WHEREAS, Section VIII-A of the Certification Procedures provides that the Executive Officer shall issue an order of certification if he or she determines that the vapor recovery system conforms to all of the requirements set forth in Sections I through VII of the Certification Procedures.

NOW THEREFORE, IT IS HEREBY ORDERED that the certification, Executive Order G-70-118, is hereby modified to delete references to specific dispenser, to certify the V-1 system for use with all types of dispensers when installed in compliance with the specifications contained herein, and to add the Husky Model V-1 nozzle and the OPW Model 11-VAA nozzle to the list of equipment certified for use with the V-1 system.

IT IS FURTHER ORDERED that the Amoco V-1 system is certified to be at least 90 percent effective for self-serve and/or attendant use at gasoline service stations when used with a Board-certified Phase I vapor recovery system. The maximum allowable dispensing rate of the Amoco V-1 system is ten (10) gallons per minute. Exhibit 1 contains a list of the equipment certified

for use with the Amoco V-1 vapor recovery system. Exhibit 2 contains installation and performance specifications for the system. Exhibit 3 contains hose configurations approved for use with the system.

IT IS FURTHER ORDERED that any alteration of the equipment, parts, design, or operation of the system certified hereby is prohibited, and deemed inconsistent with this certification, unless such alteration has been approved by the Executive Officer or his/her designee.

IT IS FURTHER ORDERED that installations of the system certified hereby shall perform in actual use with the same effectiveness as the certification test systems. If, in the judgement of the Executive Officer, a significant fraction of installations fail to meet the specifications of this certification, or if a significant portion of the vehicle population is found to have configurations which signficantly impair the system's collection efficiency, the certification itself may be subject to modification, suspension or revocation. Any revision by the Board to the certification and/or test procedures relevant to this certification may be the basis for re-evaluation of the system, and failure to meet the requirements of the revised procedures may constitute grounds for modification, suspension or revocation of this certification.

IT IS FURTHER ORDERED that compliance with the certification requirements and rules and regulations of the Division of Measurement Standards of the Department of Food and Agriculture, the State Fire Marshal's Office, and the Division of Occupational Safety and Health of the Department of Industrial Relations is made a condition of this certification.

IT IS FURTHER ORDERED that the certified Amoco V-1 Phase II vapor recovery system shall, at a minimum, be operated in accordance with the manufacturer's recommended maintenance intervals and shall use the manufacturer's recommended operation, installation, and maintenance procedures.

IT IS FURTHER ORDERED that the following requirements are made a condition of certification for any installation which is installed or modified after the effective date of this Order. The Amoco V-1 system shall be installed only in facilities which are capable of demonstrating on-going compliance with the vapor integrity requirements of the local air pollution control district ("district"). The owner or operator of the installation shall conduct, and pass, a static pressure decay test at least once in each twelve month period. Documentation of the test, including test results, shall be submitted to the district within thirty days. The district may elect to impose more stringent test frequency requirements. The test shall be conducted in accordance with a Board-approved or district-approved test procedure. (The most current draft of procedure TP-201.3 may be used until a static pressure decay test procedure is adopted by the Board.) Alternative test procedures may be used if determined by the Executive Officer to yield comparable results.

IT IS FURTHER ORDERED that, at such time as sufficient information becomes available that the fugitive emissions which may result from pressurization of the storage tanks can be quantified, if such emissions are found to adversely affect the overall effectiveness of the system, the efficiency of the system may be reevaluated and revised.

IT IS FURTHER ORDERED that the certified Amoco Phase II vapor recovery system shall be performance tested during installation for ability to dispense gasoline and collect vapors without difficulty in the presence of the station manager or other responsible individual. The station manager, owner or operator shall also be provided with instructions on the proper use of the Amoco Phase II vapor recovery system, its repair and maintenance, and where system replacement and system components can be readily obtained. Copies of the manufacturer's warranties for each of the Amoco V-1 system components shall be made available to the station manager, owner or operator.

Executed at Sacramento, California this 10th day of March, 1993.

James D. Boyd
Executive Officer

Attachments

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Exhibit 1
Amoco V-1 System Equipment List

Component	Manufacturer/Model	State Fire Marshal Identification Number
Nozzle	OPW 11V-J51	005:008:043
	OPW 11V-J61	005:008:043
	Husky Model V-1 *	005:021:006
	OPW 11-VAA *	005:008:049
	Any bootless nozzle certified in an Executive Order which identifies the Amoco V-1 system as compatible.	
Vapor Pump	Blackmer Model VR-34	001:039:001
Coaxial Hose	Any Board-certified coaxial hose listed in the current revision of Executive Order G-70-52.	
Liquid Removal System	Required for all installations. Any Board-certified liquid removal system listed in the current revision of Executive Order G-70-52 may be used.	
Pressure/Vacuum Valve (P/V valve)	OPW 523 (+8 oz., -0.5 oz.) or Any Board-certified P/V valve with a pressure setting of 8 oz. and a vacuum setting of at least 0.5 oz.	
Flow Limiter	Emco Wheaton A-10	001:007:001

* Nozzle contains a liquid removal system. When the appropriate liquid pick-up tube is installed in compliance with Exhibit 3 of this Order, this fulfills the requirement for a liquid removal system.

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Exhibit 2

Specifications for the Amoco V-1 Bootless Nozzle System

A drawing of a typical installations of an Amoco V-1 Phase II vapor recovery system is shown in Figure 2-A. The requirements and performance standards listed below apply to all systems installed or modified after the effective date of this Order.

Nozzle

1. Leaded and unleaded spouts are interchangeable.

2. All nozzles must contain a funtional vapor valve.

Coaxial Hose

1. The hoses shall be installed in conformance with the specifications contained in Exhibit 3 of this Order.

2. The hoses shall be inspected regularly for damage. Hoses with perforations exceeding 1/8" in diameter, or slits or tears in excess of 1/4" in length, or cumulative damage which similarly compromises the integrity of the vapor hose, shall be deemed defective and removed from service.

Liquid Removal System

1. A liquid removal system shall be installed in every hose. The system may be a separate component or may be a associated with either the hose or the nozzle as specified in Exhibit 1 of this Order. The system shall, at flow rates of four to ten gallons per minute, be capable of removing at least 20 milliliters/minute of liquid from the vapor hose. The presence of 100 ml or more of liquid in the hose may impair the function of the system.

Blackmer VR-3/4 Pump

1. One pump shall be installed for each dispensing nozzle.

2. Whenever possible, the pump shall be installed inside the dispenser cabinet. The pump shall be installed in accordance with the instructions of the manufacturer. Any modification of the dispenser piping must be made in accordance with the instructions of the dispenser manufacturer.

3. The pump shall be serviced only by a qualified contractor. Field service of the pump is prohibited.

4. The minimum air to liquid ratio of the system, uncorrected to standard temperature and pressure, measured at a flowrate of at least seven gallons per minute (7 gpm), shall be as high as or higher than the values listed below (linear interpolation may be used to calculate intermediate values). Any system not capable of demonstrating compliance with this performance standard shall be deemed defective and removed from service. Inability to deliver 7 gpm at full flow shall be considered failure to demonstrate compliance. The air to liquid ratio shall be determined by a Board-approved or district-approved test procedure. (Draft procedure TP-201.5 may be used until an air to liquid ratio test procedure is adopted by the Board.) Alternative test procedures may be used if they are determined by the Executive Officer to yield comparable results. Note: the test shall be conducted so as to ensure that the entire volume drawn by the pump is measured.

Flow Rate (gpm)	Minimum Air To Liquid Ratio
7	1.11
8	1.08
9	1.06
10	1.04

5. The pump makes an audible rapid clicking sound when operating normally. The clicking sound may be masked by background noise.

Vapor Lines and Tank Vents

1. The vapor line connecting dispenser to the riser shall consist of durable material listed for use with gasoline. It shall be no less than 3/4 inch inside diameter and shall be installed unobstructed.

2. The maximum allowable pressure drop through the system shall not exceed 0.02" water column measured at a flow rate of 60 SCFH with dry Nitrogen. The pressure drop shall be measured from the dispenser riser to the storage tank with the poppeted Phase I vapor connection open and with pressure/vacuum valves installed or with the vents capped.

3. All vapor return lines shall slope a minimum of 1/8 inch per foot. A slope of 1/4 inch or more per foot is recommended wherever feasible.

4. The minimum allowable inside diameters of the vapor return lines are indicated in Figure 2-A. The tanks may be manifolded at the top of the vent pipes in addition to or instead of the underground manifold. Dedicated piping is also acceptable provided the vent pipes are manifolded.

5. Tank vents shall terminate into the open atmosphere and the vent outlet shall be not less than 12 feet above the adjacent ground level. A P/V

valve shall be installed on every vent outlet. If tank vent pipes are manifolded, the manifold shall be at a height not less than 12 feet above the driveway surface used for Phase I tank truck filling operations. At least two pressure/vacuum (P/V) valves shall be installed in parallel on any vent pipe manifold, such that each can serve as a backup for the other if one should fail to open properly. The P/V valve shall be Board certified at a pressure setting of 8 ounces and a vacuum setting of 1/2 ounce or greater. The outlets shall vent upward and be located to eliminate the possibility of vapors accumulating or traveling to a source of ignition or entering adjacent buildings.

6. All vapor return and vent piping shall be installed in accordance with manufacturer's instructions and applicable regulations.

Storage Tank and Phase I System

WARNING: Phase I fill caps should be opened with caution because the storage tank may be under pressure.

1. Except during or within one hour after a bulk delivery, the static pressure in the storage tank shall not exceed one inch (1") water column. A threaded tap at least one-eighth inch (1/8") in diameter shall be installed in the system at which the tank pressure may be monitored. The tap may be in the dispenser riser connection or on the vent line, and shall be accessible for connection to a pressure gauge. One tap is adequate for manifolded systems. The tap shall remain plugged and vapor tight except when test equipment is being connected to or removed from it. If located on the vent line, the tap shall be at least six feet (6') and not more than eight feet (8') above the ground. Compliance with this pressure standard shall be determined based on readings from a pressure gauge or transducer by visual observation of, or a permanent record of, the readings.

2. Coaxial Phase I vapor recovery systems shall not be used in new installations of Amoco V-1 Phase II systems after January 1, 1994. Replacement of storage tanks at existing facilities, or modifications which cause the installation of new Phase I vapor recovery equipment, are considered new installations with regard to this requirement. Two point Board-certified Phase I systems shall be installed at these facilities.

3. The Phase I vapor and fill caps provide an additional seal which may prevent vapor emissions when they are in place. However, the caps must be removed during Phase I operations and may result in loss of vapor from the storage tank. Therefore, compliance with static pressure decay test criteria shall be demonstrated with these caps removed.

4. The Phase I vapor recovery system shall be operated during product deliveries so as to minimize the loss of vapors from the facility storage tank, which may be under pressure. This may be accomplished in the following manner: The Phase I vapor return hose is connected to the delivery tank and to the delivery elbow before the elbow is connected to the facility storage tank. The delivery tank vapor valve is opened only after all vapor connections have been made, and is closed before disconnection of any vapor hoses. The vapor hose is disconnected from the storage tank before it is disconnected from the delivery tank.

5. Spill containment manholes which have drain valves shall demonstrate compliance with the static pressure decay criteria with the drain valves installed as in normal operation. Manholes with cover-actuated drain valves shall demonstrate compliance both with the cover open and with the cover closed.

Non-retail Fueling of Special Vehicles

1. For non-retail outlets which fuel special vehicles, the installation of vapor recovery hoses longer than those specified in this Order are allowed of the following conditions are met:

   a. The non-retail outlet fuels special vehicles such as large trucks, large skip loaders, off-the-road equipment, etc., where reaching the fill pipe requires longer hoses.

   b. At least one of the following conditions exists:
      - A liquid system is installed capable of removing any accumulation of liquid which may occur with the proposed hose configuration;
      - The hoses are arranged to be self-draining;
      - Provisions are made to drain the hoses after each refueling;
      - The system incorporates an approved liquid blockage detection system arranged to cease dispensing when a blockage occurs.

   c. The Executive Officer has approved the plans for compliance with condition b.

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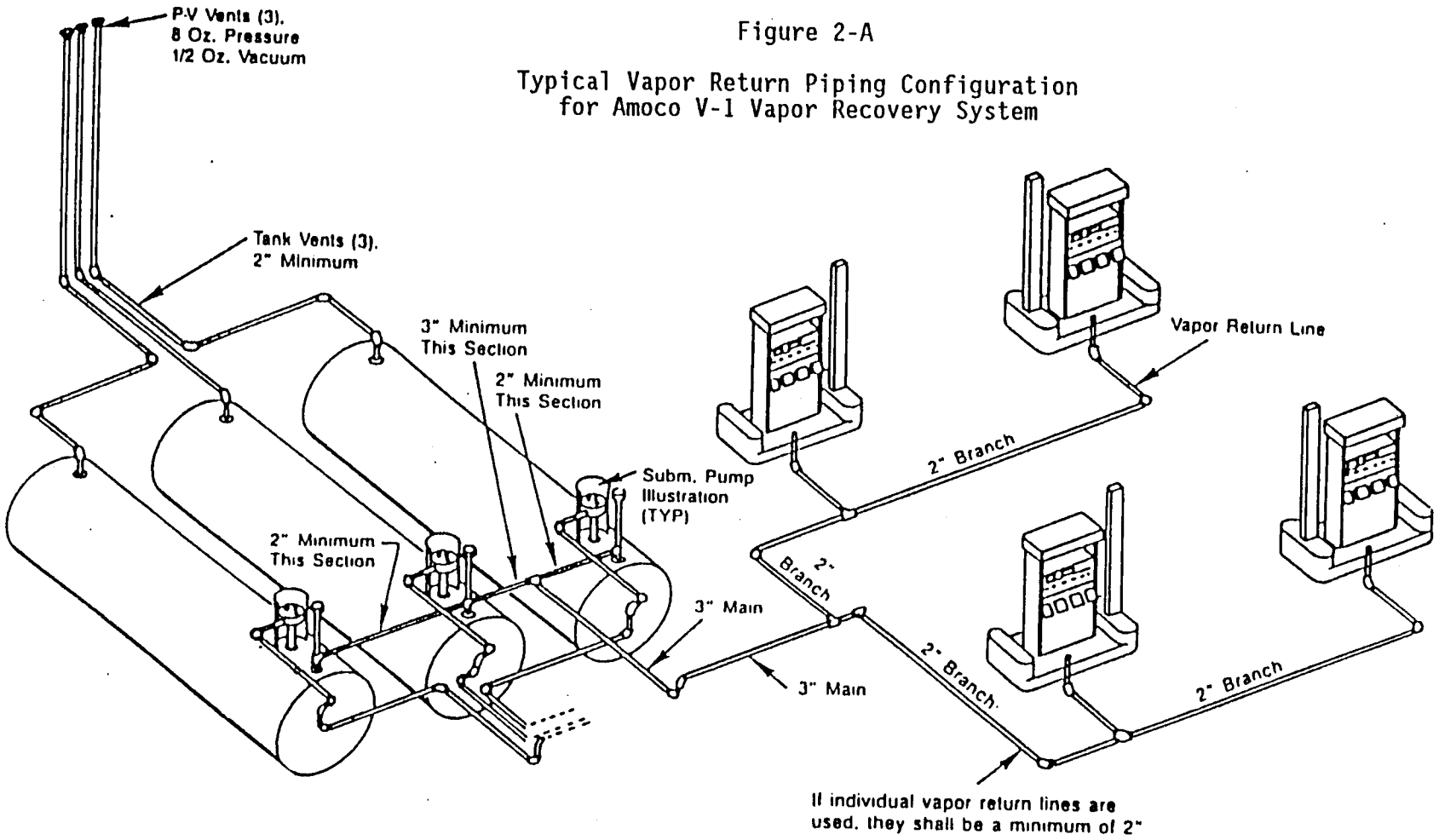
Figure 2-A

Typical Vapor Return Piping Configuration
for Amoco V-1 Vapor Recovery System



Note: Tanks may be manifolded at the vents in addition to or instead of underground. Dedicated piping is acceptable providing the vent pipes are manifolded. At least two pressure/vacuum valves in parallel are required with all vent manifolds.

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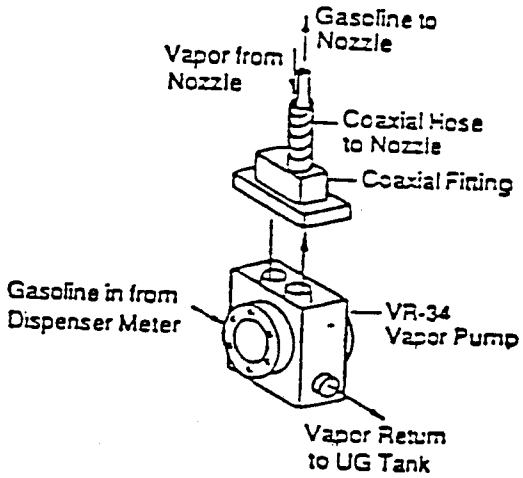
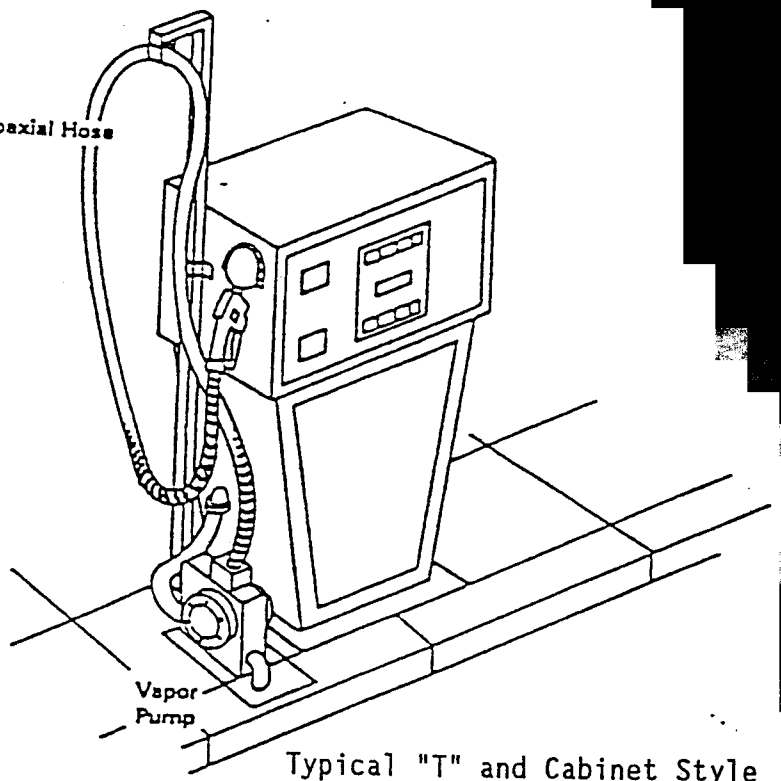
Figure 2-B

Typical Vapor Pump Installations
for Amoco V-1 Vapor Recovery System

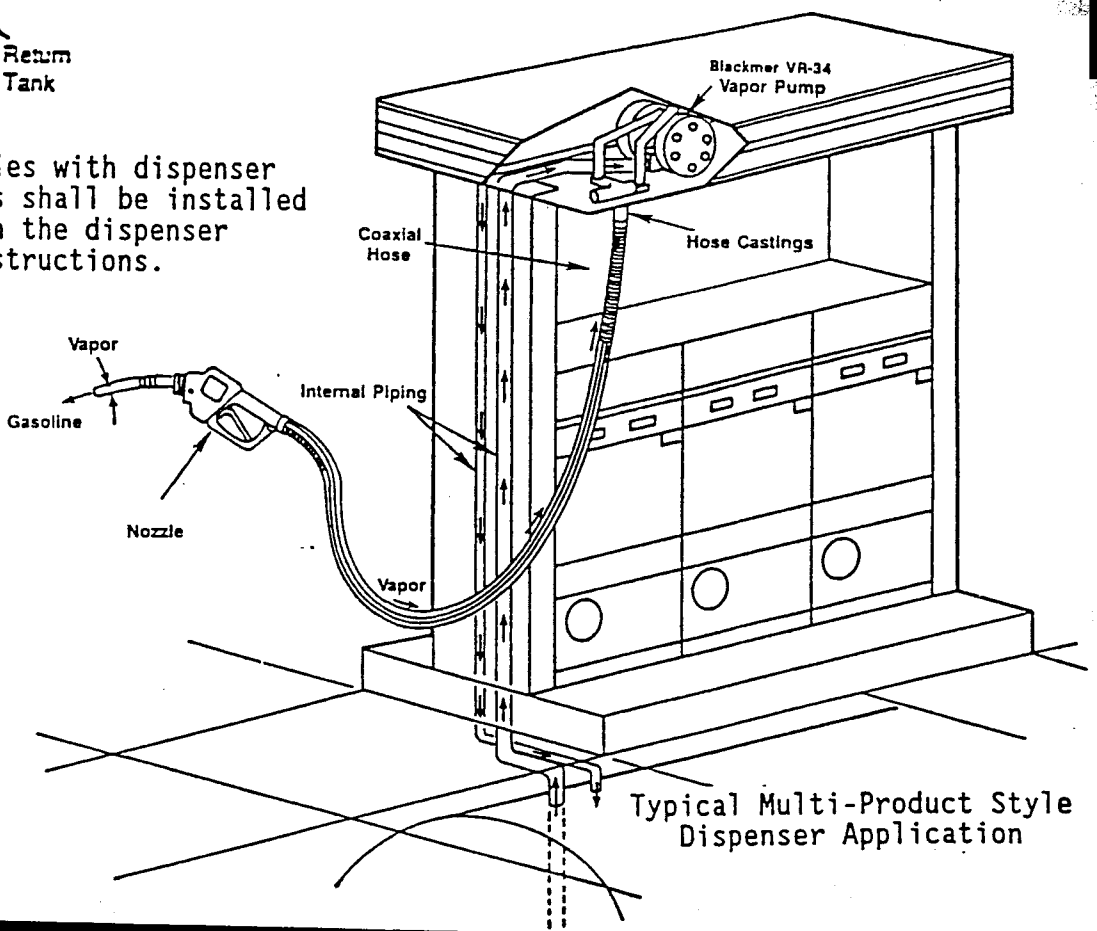
Typical vapor pump hook-up



Note: Pump location varies with dispenser type. Vapor pumps shall be installed in accordance with the dispenser manufacturer's instructions.



Typical "T" and Cabinet Style
Dispenser Application



Typical Multi-Product Style
Dispenser Application

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Figure 2-C

Generic Schematic of Amoco V-1 Phase II Vapor Recovery System

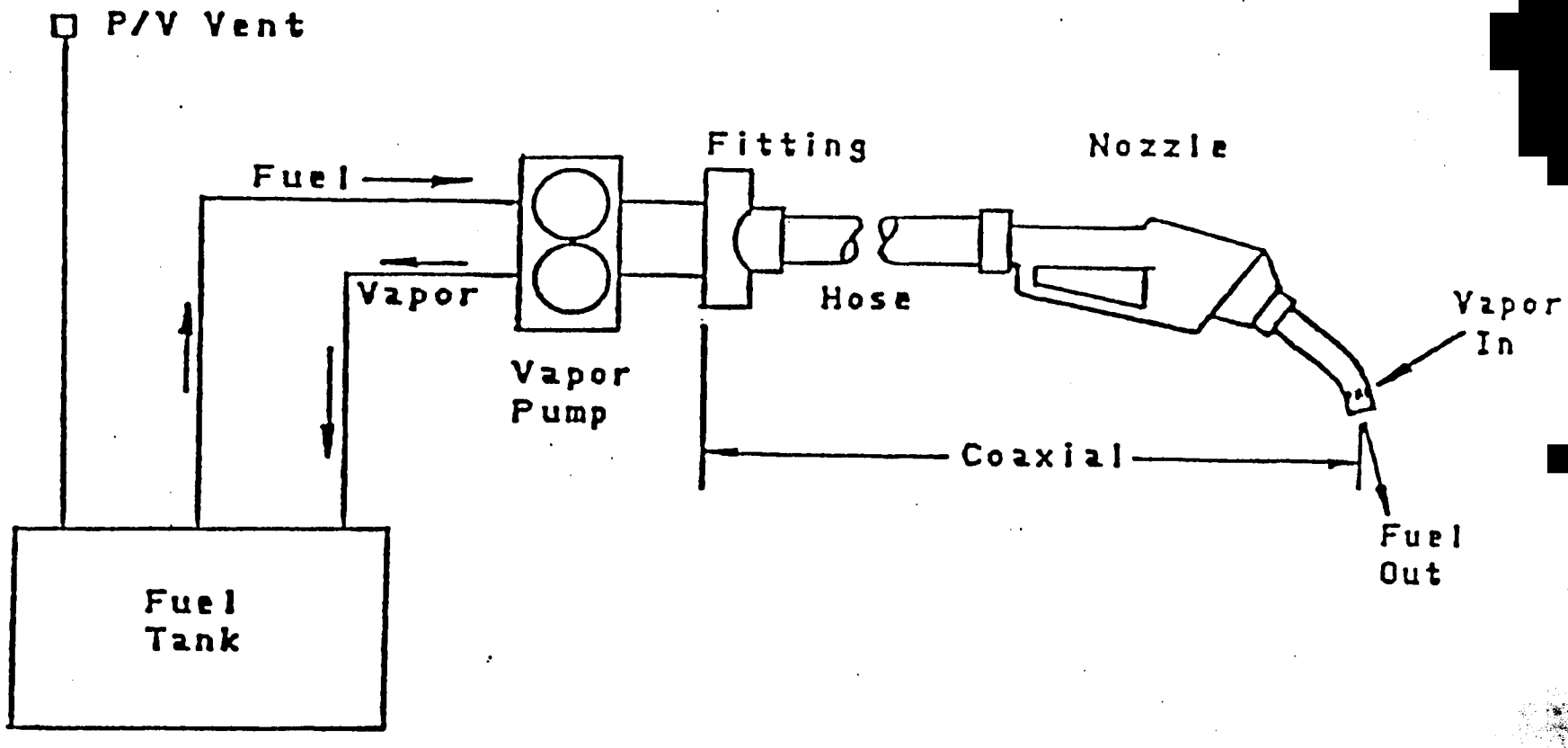

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Exhibit 3

Amoco V-1 Vapor Recovery System Hose and Dispenser Configurations

Figure 3-A contains diagrams of the hose configurations. The drawings are intended to be generic in nature and apply to dispensers similar to the models shown. Dispensers may have more or fewer hoses than shown.

All Configurations

1. A liquid removal system is required. The liquid removal system shall be located so as to be capable of removing at least 20 milliliters per minute at least 50 percent of the time when the nozzle flowing at 4 gpm and is latched into the fillpipe of a vehicle which:
   - is parked four feet plus or minus one half foot ($4\pm1/2'$) from the dispenser face;
   - is parked with the fillpipe on the side of the vehicle closest to the dispenser being tested; and
   - has a fillpipe located thirty plus or minus three inches ($30\pm3"$) above the driveway surface.

2. The "hose assembly" includes all breakaways, optional swivels and other components. All hoses, including "pigtail hoses," are also specifically included in the term "hose assembly."

3. The hose may not touch the island or the ground when not in use. In the case of a dogbone island where the wider island ends protect the hose from damage by vehicle tires, the hose may touch the vertical face of the dogbone island at the option of the local air pollution control district.

4. Use one inch or larger inside diameter galvanized pipe for riser. (Exception: For Dispenser Configuration 5 only, 3/4 inch or larger ID vapor riser may be used.)

5. A flow limiter is required on all dispensers that have a maximum flowrate in excess of 10 gallons per minute.

Dispenser Configuration 1 - High discharge coaxial hose configuration

1. The hose assembly may not exceed 10-1/2 feet in length.

Dispenser Configuration 2 - High retractor coaxial hose configuration

1. The hose assembly may not exceed 12 feet in length.

Dispenser Configuration 2 (continued)

2. The hose retractor shall fully retract the hose to the top of the dispenser when not in use. The tension on the retractor should not be in excess of that required to accomplish this.

3. The hose and retractor shall be installed so as to permit natural drainage from the retractor clamp into the dispenser when not in use.

Dispenser Configuration 3 - High discharge coaxial configuration with retractor and hose loop

1. The hose assembly may not exceed 13-1/2 feet in length.

2. The hose retractor shall fully retract the hose to the top of the dispenser when not in use. The tension on the retractor should not be in excess of that required to accomplish this.

3. The hose and retractor shall be installed so as to permit natural drainage from the retractor clamp into the dispenser when not in use.

Dispenser Configuration 4 - Low profile coaxial configuration with retractor

1. The hose retractor shall fully retract the hose to the dispenser when not in use. The retractor clamp shall be positioned to avoid any bulge of hose between the clamp and the dispenser outlet swivel.

Dispenser Configuration 5 - High retractor, low discharge coaxial configuration

1. Vapor return piping and vapor pump may be installed on the inside or the outside of the dispenser cabinet.

2. The hose retractor shall be positioned 5 to 7 feet above the island surface.

3. The hose retractor shall fully retract the hose when not in use. The tension on the retractor should not be in excess of that required to accomplish this.

4. The hose and retractor shall be installed so as to permit natural drainage from the retractor clamp into the dispenser when not in use.

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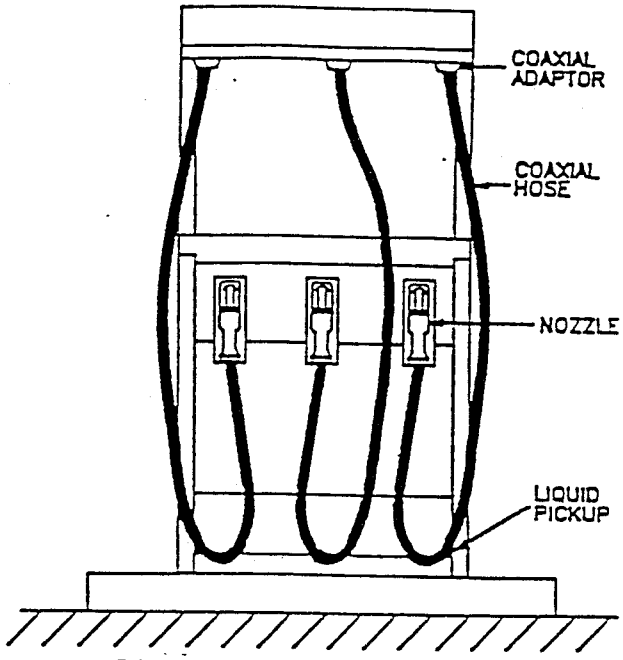
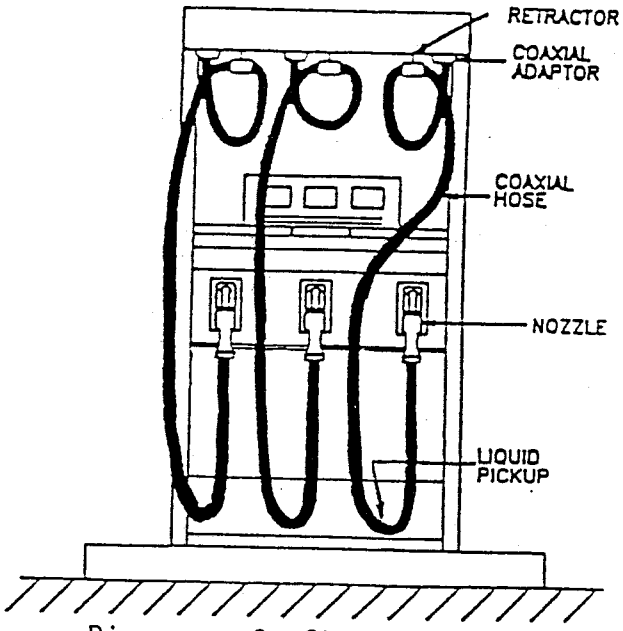
Figure 3-A

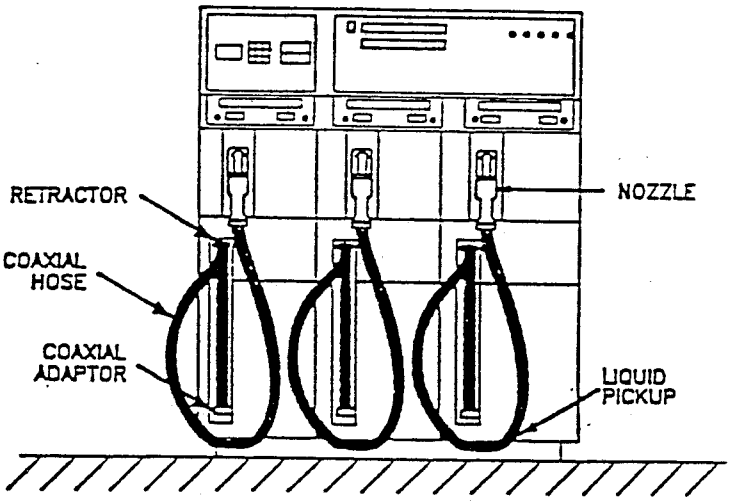
Amoco V-1 Vapor Recovery System
Hose and Dispenser Configurations



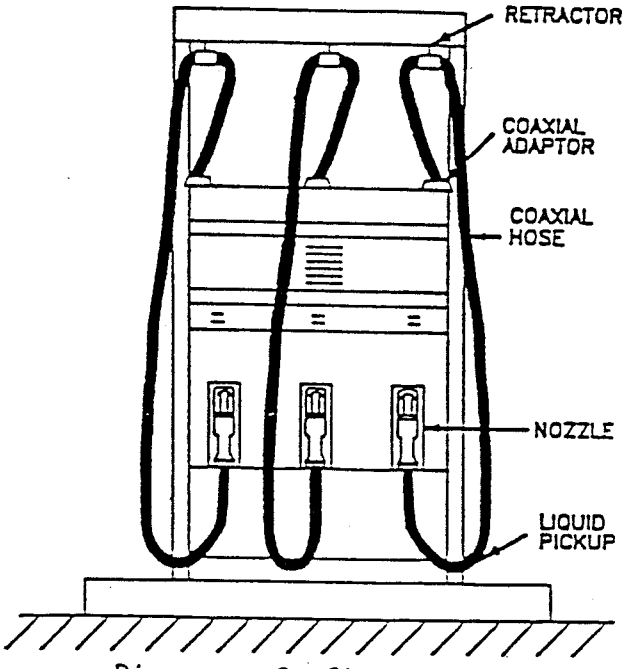
Dispenser Configuration 1



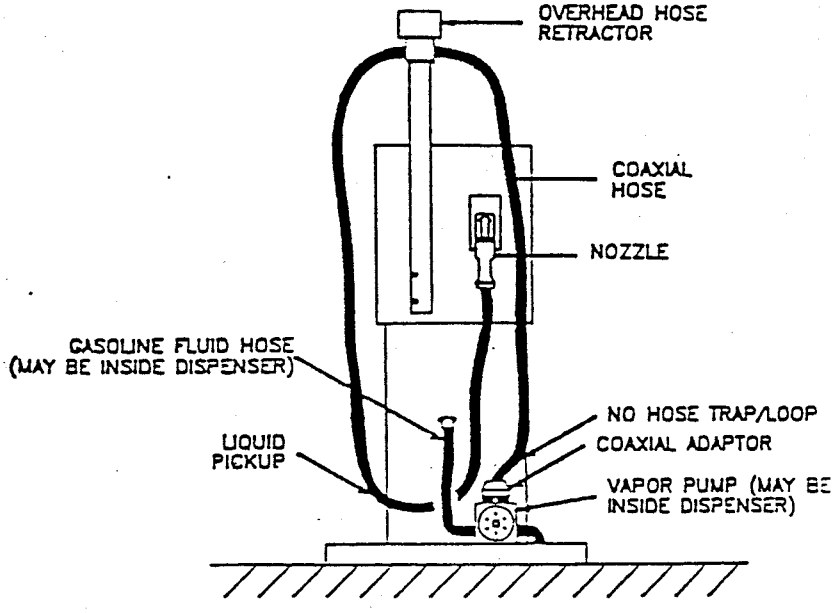
Dispenser Configuration 3



Dispenser Configuration 4



Dispenser Configuration 2



Dispenser Configuration 5